LISBOA SCHOOL OF ECONOMICS & MANAGEMENT

SINCE 1911

MASTER OF SCIENCE IN FINANCE

MASTERS FINAL WORK

DISSERTATION

HOUSEHOLD SAVING DECISIONS – AN EMPIRICAL ANALYSIS BASED ON SHARE

PEDRO DESLANDES CORREIA VASCONCELOS MARQUES

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SUPERVISOR:

PROF. MARIA TERESA MEDEIROS GARCIA

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Abstract

This work studies the household saving behavior in what concerns to the ownership of IRA's in Europe. Detailed analysis is presented of factors that might influence the ownership of IRA's. The empirical analysis is based on Survey of Health Ageing and Retirement in Europe (SHARE) and used data from Wave 2 (2006-2007) and Wave 4 (2010-2011). Nine countries were selected from the ones included in both waves of SHARE and that belong to EU. To evaluate the impact of retirement in the ownership of IRA's, were used samples for people in pre-retirement age (<65 years) and post-retirement age (≥65 years). The results suggest that age, years of education, income and ownership of dwelling influence positively and significantly household saving, while number of children, marital status and risk aversion have a negatively effect. Marital status and income are not statistically significant for retired people.

Keywords: Households, savings, retirement, SHARE, Europe

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Acronyms List

SHARE – Survey of Health, Ageing and Retirement in Europe

IRA's – Individual Retirement Accounts

EU – European Union

USA – United States of America

MISSOC – Mutual Information System on Social Protection

LCH – Life-cycle Hypothesis

SSS – Social Security Systems

TIAA-CREF – Teachers Insurance and Annuity Association of America - College Retirement Equities Fund

INE – Statistics Portugal *(Instituto Nacional de Estatística)*

IDEF – Household Expenditure Survey *(Inquérito às Despesas das Famílias)*

GDP – Gross Domestic Product

HRS – Health and Retirement Study

TCRS – Transamerica Center for Retirement Studies

ELSA – English Longitudinal Study of Aging

JSTAR – Japanese Study of Aging and Retirement

CHARLS – China Health and Retirement Longitudinal Study

HILDA – Household, Income and Labour Dynamics in Australia

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"This paper uses data from SHARE wave 4 release 1.1.1, as of March 28th 2013 or SHARE wave 1 and 2 release 2.6.0, as of November 29th 2013 or SHARELIFE release 1, as of November 24th 2010. The SHARE data collection has been primarily funded by the European Commission through the 5th Framework Programme (project QLK6-CT-2001-00360 in the thematic programme Quality of Life), through the 6th Framework Programme (projects SHARE-I3, RII-CT-2006-062193, COMPARE, CIT5-CT-2005-028857, and SHARELIFE, CIT4-CT-2006-028812) and through the 7th Framework Programme (SHARE-PREP, N°211909, SHARE-LEAP, N°227822 and SHARE M4, N° 261982). Additional funding from the U.S. National Institute on Aging (U01 AG09740-13S2, P01 AG005842, P01 AG08291, P30 AG12815, R21 AG025169, Y1-AG-4553-01, IAG BSR06-11 and OGHA 04-064) and the German Ministry of Education and Research as well as from various national sources is gratefully acknowledged (see www.share-project.org for a full list of funding institutions)."

1. Introduction

Today the world faces the greatest economic and financial crisis since the *Great Depression* which started, in 1929, in United States of America and whose effects were felt in the most diverse countries (Martinez-Fernandez et al, 2012).

The current crisis were preceded by a period of strong world economic growth, a relatively stable and low inflation and a poor regulation that led the states, financial institutions, firms and households to a situation of over indebtedness that proved to be unsustainable (Coe et al, 1988).

The current situation is dominated by an economic and financial crisis of high dimensions that reveal a world in fast change and transformation, where there are occurring shocks, ruptures and reforms at rhythm with no precedents and where there is permanent uncertainty, questioning and jeopardizing the sustainability of major economic and social institutions constructed over the last decades (Colander et al, 2009).

To the global economic and financial problems joined the social problems as for example the poverty, criminality and violence, youth delinquency, social exclusion, racism, unemployment and social differences (Bartlett and Uvalić, 2013).

On the other hand, the recent demographic trends didn't help this situation since it is characterized by low levels of birth rate in the most developed countries and high levels of birth rate in the less developed regions, by the decline in mortality rates, by

the increase in life expectancy and the consequent worldwide aging and by high migration flows (Martinez-Fernandez et al, 2012).

All these problems have caused in the social security systems a lower proportion of working age population and a higher proportion of older people as well as people receiving social benefits with a consequent increase in expenditures and decrease in revenues. Hence, the impact on SSS financial sustainability and the need for reform. At the same time, many private sector schemes are facing severe funding difficulties as a result of poor stock market returns, fall in interest rates and increased longevity (Bloom et al, 2007).

Given this macroeconomic scenario it is important to try to understand how people and households are reacting to these all problems that affected their jobs, their incomes, their consumption and saving habits, their levels of debt, and that deep profoundly changed their lives, and if they are really increasing their levels of saving as they should be doing.

In this way, and since the actual global crisis is jeopardizing the sustainability and credibility of the major economic and social institutions, this work has the objective of analyzing the households reactions to survive this global crisis, especially in what concerns to the changes in their saving habits.

To perform this study, it is necessary to analyze the combination of a wide range of factors, such as age, gender, nationality, education, marital status, job situation, income, among others, and understand if these factors statistically influence household saving decisions and how.

The empirical analysis is based on the micro data of the European project *Survey of Health, Ageing and Retirement in Europe* (SHARE). SHARE consists in a questionnaire that is only answered by people, with 50 years or over, from 20 European countries and Israel and is organized in five waves[1] and includes information about health, socio-economic status and family networks.

With this work, I want to complement the existent literature about the household saving decisions in Europe (some countries of EU), its determinants and their influence on it, as well as improve the SHARE publications since it has few works in this topic. In addition provide a study about the household behavior in Portugal and examine the changes between the two periods where several Social Security System reforms took place.

This dissertation is organized in seven sections. In the second section, there is a literature review about the determinants of household saving and behavior. In section three, it's presented the data base to be used (SHARE) and which data is going to be used. In the next section, it's explained the model and the methodology to be used. The fifth section presents the results and the analysis for the descriptive statistics about the ownership of Individual Retirement Accounts by country, age and gender. In the Empirical Results, the results obtained by application of the different models are presented, justified and compared with the studies already done. Lastly, in seventh section are referred the main conclusions, the limitations of the work and some suggestions for future works.

[1] The fieldwork for Wave 5 was done but collected data and the conclusions weren't released yet

2. Literature Review

The current economic and financial crisis and the recent demographic trends are causing pressure and strain in the financial sustainability of the systems that provide financial security for retired people, endangering the future of those systems.

For this reason, people are starting to realize and being more concerned about the extent of this problem, and because of that they should be taking more saving decisions.

According to Garcia et al (2011) the promotion of private savings is the most difficult policy target to achieve because individuals take their own saving decisions and it is up to them to adopt a saving behavior. The authors refer that "*individual behaviour with respect to retirement saving is highly dependent on the default options of personal pension plans, as well as on various socio-economic and psychological characteristics*".

With this work it is intended to analyze the households' reactions to survive this global crisis, especially in what concerns to the changes in their saving habits.

In this way it is important to understand which are the motives that lead people to take saving decisions and the factors and/or variables that influence those decisions.

Several authors have already studied the subject and there are some works and studies done on this matter.

According to Sturm (1983) the main motives that influence households saving decisions are retirement (saving for retirement), uncertainty (preventive saving) and bequest.

People save for retirement because they want to have a more comfortable life when stop to work, assuring they will have the wealth level required to finance their retirement consumption. The financial sustainability problems of the aforementioned systems have an important role here. It makes people think if they will receive, from pension(s), enough money to maintain their current life quality.

Life Cycle Hypothesis is the theory that dominates the analysis of how saving rate behaves. According to this theory, the main motivation for households saving is to accumulate resources for later expenditure and to support their consumption when they retire and if the income grows at a constant rate, aggregate household saving tends to grow at the same rate (Modigliani, 1966). In this way, if households income is lower, they tend to save less, as well as when they have higher spending needs.

This theory also says that household saving should be positive during their working span and negative when they retire and wealth should be hump-shaped (Modigliani, 1986) and at any time the discounted present value of all future consumption is equal to the discounted present value of all future earned income plus the present net wealth.

Looking at Chart 1, is possible to see that during pre-retirement people consume less than the disposal income, accumulating, in this way, wealth. At retirement age, wealth reaches its maximum value and after that moment, wealth starts to reduce due to

higher consumption than disposal income, meaning that begins the dis-saving period. It is possible to conclude that during the pre-retirement period, households have positive saving, negative through retirement converging to 0 until death.

Feldstein (1974) defends that social security contributions reduce disposable income, as well as, reduce the private saving. He also defends that private saving decrease, if there is no net income by the combination of social security taxes and benefits. In this way, he concluded that SSS essentially depresses personal savings.

Jappelli and Modigliani (2003) concluded that total saving is the relevant measure of the change in assets accumulated for retirement because people are able to change optional saving in response to the changes in the compulsory saving. They also refer that compulsory saving programs and the application of retirement plans guarantee people the sufficient reserves to be used during their retirement.

Life Cycle Hypothesis assumes that future events, as the date of death or the income stream, are known and certain. However, we know that future is unknown and uncertain. For this reason, households are motivated to do some preventive saving.

Besides these two motives, people can also save for bequest, i.e. households accumulate wealth beyond the levels required to financial retirement consumption. In a stationary economy, saving for bequest means transference of a constant level of assets from one generation to the next, with null effect on saving ratio. However, in a growing economy the bequest transferred between the two generations is growing and require a positive lifetime saving (Sturm, 1983).

In addition to these three main motives, we can also consider other motives that lead households take saving decisions. For example, people can save during the year for his vacations, for other expenditures as wedding celebrations, a car, a house, education or any other kind of investment.

Sturm (1983) points demographic factors, household characteristics, the effects of rate of growth and institutional and financial factors as influencers of household savings.

As demographic factors, there is life expectancy – when it increases, household saving ratio increases too – retirement age – increase the household saving ratio, when it declines – and age distribution – aggregate household saving ratio depends on the relative share of households of certain ages in the number of households.

In the side of the household characteristics, Sturm refers the family size, the average age of entry into job market of young people and the female participation ratio. Sturm mentions the family size because over the life cycle, normal households vary the number of members which have influence in the consumption and therefore in saving. Closely related to this variable, Sturm mentions the average age of entry into job market of young people and the period of formal education because when it increases, it tends to extend the duration of young adults in household and therefore influence household consumption and saving ratio. Finally the author refers the female participation ratio which determines the households with two income sources.

In the last group of factors, institutional and financial factors, Sturm points the financial intermediation and capital markets, compulsory public pension schemes, inflation, income and taxation.

About financial intermediation and capital markets, the author refers that variations in saving ratios can be explained by the differences in the functioning of financial markets and by the government regulations of those markets. He also refers that variations in the interest rate have an ambiguous effect on saving rate, since a change will cause an income and a substitution effect, which operate in opposite directions. On other hand, the effect of credit availability on saving ratio depends on the households' optimal consumption in relation to their actual income time profile. If there are no credit limitations, young households would possibly be net borrowers because of their relatively low level of income and high expenditures related to household formation.

To Sturm compulsory public pension schemes can affect households' life-time budget restriction in two ways. So, life time disposable income decrease by the amount of payroll taxes paid as contributions to the scheme and increase by the amount of pension payments received after retirement.

To this author an increase in the inflation will increase precautionary savings because it increases income uncertainty.

The influence of income is controversial and appears to be no plausible explanation for the high marginal propensity to save out of the transfers, once it is inconsistent with the fact that equalizing income distribution reduces saving.

Finally, Sturm refers that the effect of taxation in saving is dependent of the way that government manages that resources that are transferred to the public sector in the form of tax revenue – an increase in taxation reinforces a depressant effect on the

national saving ratio if the marginal propensity to consume of governments is higher than the same propensity of private sector.

Lundberg and Ward-Batts (2000) used the first wave of the Health and Retirement Study (period between 1992 and 1994) to analyze the effects of husband and wife characteristics in saving behavior, in USA, and concluded that those characteristics are an important predictor of married couple households saving decisions.

They found that, while age, health status and education of both partners are important determinants of net worth, simple measures of relative bargaining power do not in general have significant effects on household assets. However, the age difference in education between husband and wife is only significant when the husband has eight or more years of education in comparison with his wife. This fact implies that the wife has less power over household decision and therefore, household net worth is lower. But, the age difference seems to not have a significant effect on net worth.

Clark et al (2006) analyzed how the participants reacted, before, during and after, to a Financial Education Seminars, in USA, conducted from March 2001 to May 2002 by the Client Services division of TIAA-CREF. These seminars had as objective to provide financial information that assists persons in the retirement planning process.

The answers to the survey in the three different phases showed that educational events, like this, have influence in retirement saving behavior as well as individuals revised and might alter retirement goals and saving behavior.

According to a study of retirement done by Fernandéz-López et al (2010), that used a *Probit* model, the main determinants that influence saving behavior in some EU countries[2] are age, financial literacy, income and nationality.

Age, financial literacy and individuals' income influence positively retirement savings. This means that as age increases, the probability of saving also increase, as well as the individuals with higher financial education and knowledge and with higher income.

The same study also refers the nationality as a saving determinant. In this way, individuals that live in countries like United Kingdom or Sweden, which have mandatory private pension plans are positively influenced by their nationality, while individuals from France or Italy, which have no mandatory private pension plans but public pension systems, are negatively influenced.

Alves and Cardoso (2010), present an evolution of household saving rate in Portugal between 1985 and 2009, analyzed statistically the relation between household saving rate and some variables and present the factors that explain the evolution of household saving rate.

These authors used microeconomic data from Household Expenditure Survey (IDEF), conducted by the National Statistics Institute (INE) in 2005/06, to estimate some regressions to explore Portuguese wealth and to analyze statistically the relation between household saving rate and some variables - household region, age, current job situation, education level, household size, number of household members working

[2] France, Germany, Italy, Netherlands, Poland, Spain, Sweden and UK

beside the representative and presence of spouse/partner in household and her education level.

In the estimated regressions, the estimated coefficients measure the impact of the variables on the mean of the distribution of saving (or saving rate) or on its percentiles.

It was concluded that the household saving increases along the life cycle and is positive related with the level of education, which is evident in the higher percentiles of saving distribution. It was also concluded that there is a negative relation between unemployment and saving rate, meaning that the households with unemployed representative save less than the ones with a representative working. In households where the representative is retired, the level of saving doesn't change too much compared to the ones working, mostly due to the social security rules and the tax system in that period. The number of household members working has statistical significance, since the saving rate increase considerably with any additional working member in the household. Although the household size doesn't influence significantly the saving rate but the presence of partner in household does.

In this way, the main point is that the saving rate or level is influenced by the household capacity to generate income and not by its size.

Lastly, the fact that households owning the dwelling they live presupposes a greater saving rate or level, which is more significant for the top saving distribution percentiles.

The same authors present also factors that explain the evolution of household saving rate which are inflation, real interest rate, fiscal policy, GDP growth rate and wealth.

They refer that inflation is positively related household saving rate in two ways. On one hand, periods of high inflation generate higher uncertainty and in these periods households tend to increase their savings for precaution. On the other, higher inflation tends to erode the households financial wealth value, promoting an increase in households saving rate aiming to compensate for this effect.

Empirically, the relation between saving rate and real interest rate are considered ambiguous and/or not significant. However, an increase in the real interest rate will increase the opportunity cost of current consumption comparing to future consumption, which will cause that households postpone their consumption expenditures, increasing in this way the saving rate (substitution effect). In other side, the effect of increasing future income associated with higher earnings from accumulated savings can lead to an increase in current consumption (income effect).

The study also refers that government decision have influence on saving and consumption households decisions. Fiscal policy is an example of that, and economic theory suggests a negative relation between fiscal balances and household saving rate. This means that a decrease in the fiscal balance, associated with a reduction of taxes or an increase of spending with households, will lead to an increase in household saving rate. However, the authors refer that there is a positive relation between household saving rate and the economic growth (GDP growth).

Finally, the authors refer that significant variations in wealth are expected to be reflected in opposite direction variations in the household saving rate.

Jappelli and Padula (2013), estimated two equations using microeconomic data by the merge of SHARE with SHARELIFE to analyze the relation between financial literacy and saving decisions. They defined an indicator of current financial literacy and defined mathematical skills at school age as initial literacy.

They concluded that financial literacy and wealth are positively correlated over the life-cycle and the early improvements in mathematical skills will eventually increase households' financial literacy and, therefore, wealth accumulation.

Alessie et al (2013) used data from SHARELIFE to estimate the effects of pension wealth on household savings and the main results suggest that, due to the pension reforms in Europe, households will increase private savings but not enough to smooth consumption over the life-cycle.

To conclude, Beckmann et al (2013) used data from Euro Survey of the Oesterreichische Nationalbank to analyze the household saving decisions between 2010 and 2011 of ten European countries[3]. They considered explicative variables as age, gender, household size, presence of children, income, education, job situation, expectations and risk averse. To measure the impact of these variables on saving behavior, the authors estimated a *Probit* model and concluded that middle-aged people are most likely to save when compared with younger and older people,

[3] Albania, Bosnia and Herzegovina, Bulgaria, Czech Republic, Croatia, Hungary, Macedonia FYR, Poland, Romania and Serbia

employment, income and education have positive and significant effect on households' savings, the number of younger children in household has positive effect but insignificant and the number of teenage children has also insignificant effect but negative, households with two persons tend to save more than the ones with single person, three or more, and finally risk averse people are more likely to save.

The present work follows the methodology used by Fernandéz-López (2010) and Beckmann et al (2013), the use of Probit models, and using micro data of SHARE to come up with results and take conclusions about the variables that influence household saving, in what concerns to the ownership of Individual Retirement Accounts, in Europe.

3. Data and Data selection

The current work uses data from Survey of Health Ageing and Retirement in Europe (SHARE). The SHARE project started in 2004-2005, with Wave 1, collecting data about health, socio-economics and social networks on people aged 50 or more in various regions in Europe[4]. Later in 2006-2007, with Wave 2, new countries[5] joined the SHARE project and was collected a first longitudinal follow–up and a refresher sample was added to maintain the representativeness of the survey. In 2008-2009, the third wave of data collection for SHARE, also known as SHARELIFE, questioned all previous respondents about their entire life history information. In the last wave, Wave 4 (2010-2011), more countries joined the project[6] and new integrated social networks module with respective generated variables were added.

Due to the fact that Wave 3 does not include any variable related to household saving, it will be taking in consideration Wave 2 to make an analysis about the evolution of saving decisions in EU before and after the financial crisis. To take conclusions about household saving in Portugal, will be used Wave 4 because Portugal was only included in the survey in that wave.

In order to pursue the study, the selected dependent variable is *Has individual Retirement Accounts* because this variable assures more accurate answers than, for example, *Amount Individual Retirement Accounts.* People are more willing to answer if they do or not do savings than to tell the amount of savings (table 1).

[4] Austria, Belgium, Denmark, France, Germany, Greece, Italy, Netherlands, Spain, Sweden, Switzerland and Israel
[5] Czech Republic, Ireland and Poland
[6] Estonia, Hungary, Portugal and Slovenia

The considered independent variables are *Age*, *Gender, Nationality, Education, Marital Status, Presence of Partner in household, Household size, Number of Children, Income, Job situation, Owner of the Dwelling* and *Risk Aversion.*

The dependent variable is included in *Assets* module, while the independent variables are spread out by *Children, Coverscreen, Demographics, Employment and Pensions, Expectations, Household Income and Housing* modules. Therefore, it was needed to merge these modules and create a new data file.

This data file was then split into two groups: people with age between 50 and 65 (pre-retirement) and people with more than 65 years (post-retirement). The objective of this division is to have a better understanding about the differences, in what concerns to saving decisions, between people in working age and retired people[7].

The software that was used to process the data and to construct the referred samples was IBM-SPSS® v21.0 and to do the regressions, the tables and the statistical tests was Stata® v12.0.

[7] According to MISSOC, 65 years is the prevalent legal retirement age

4. The Model

The considered dependent variable is a binary variable, which represent the owning or not of retirement accounts, assuming value of 1 if the individual answered *Yes* and value of 0 otherwise. In this way and following the study done by Fernández-López (2010) and by Beckman et al (2013) was adopted a *Probit* model.

A *Probit* model is a type of regression used when the dependent variable is binary and it's represented by the following equation:

$$y^* = \alpha + \sum X\beta + \varepsilon, \varepsilon \sim N(0,1), \quad (1)$$

where y^* represents the unobserved continuous variable that determines the value of y, α the constant, X the vectors of the independent variables, β the parameters and ε the random disturbance term. The value of y is obtained as follows:

$$y = \begin{cases} 1 \; if \; y^* > 0 \\ 0 \; otherwise \end{cases}. \quad (2)$$

This equation was estimated for the following countries: Austria, Denmark, France, Germany, Italy, Netherlands, Portugal, Spain and Sweden. Belgium also belongs to EU and has data available for both waves but was not selected because the data is split by French Belgium and Flemish Belgium.

Several versions of the model are estimated according two waves and according pre or post-retirement ages (table 2). First, it was applied for a general sample with all countries for both Waves 2 (with 1 240 observations – Model 1) and 4 (with 9 306 observations – Model 2). Second, for a sample, compounded for the same countries,

but for people aged between 50 and 65 with 355 observations in Wave 2 (Model 3) and 4 450 in Wave 4 (Model 4) and for people aged more than 65 with 885 and 4 856 observations for Wave 2 (Model 5) and 4 (Model 6), respectively. Lastly, it was also applied for a sample only including Portugal[8] and within the same parameters, general (1 247 observations – Model 7), people aged between 50 and 65 (531 observations – Model 8) and aged more than 65 (716 observations – Model 9).

In the second section of this work were presented explicative variables used by several authors that studied and analyze the determinants of household savings. As previously mentioned and justified, in the present work were tested the following variables: *Age (age)*, *Gender (male), Nationality (nationality), Education (years of education and high education), Marital Status (married), Partner in household (partner in household), Household size (household size), Number of children (number of children), Income (income)*[9]*, Job situation (employed), Owner of the Dwelling (own dwelling)* and *Risk aversion (risk).*

In the model applied for Portugal was excluded the variable *Nationality* because its inclusion makes no sense once it is a single country being tested.

[8] Introduced only in Wave 4

[9] The variable considered for income represents the total income received in previous years (2005 and 2009, respectively)

5. Descriptive Statistics

Before analyzing the effects of all the variables in saving behavior, it is important to evaluate the household saving panorama in SHARE population.

The first aspect that can be pointed, looking at tables 3, 4 and 5, is that there is a trend for higher positive answers for people aged between 50 and 65 comparing to the general sample and lower positive answers for the ones aged more than 65 also comparing to the general sample.

This is reflected in a considerable percentage decrease of saving from the population with age between 50 and 65 years to population aged more than 65 years. In all the countries, with exception of France and Sweden, this decrease was in about half level or more of positive answers of population with 50 and 65 years.

With this fact can be concluded that after retirement people start to reduce their savings and to consume with the savings done during their pre-retirement period.

Analyzing how the answers are distributed in the sample population (table 3), it is possible to see that the percentage of people with Individual Retirement Accounts decreased from 20.83% (of 13 489 respondents), in Wave 2, to 19.52% (of 19 466 respondents), in Wave 4.

The population aged between 50 and 65 and with more than 65 also followed the same declining trend. The first decreased from 33.22% (of 3 748 respondents), in Wave 2, to 28.63% (of 7 432 respondents), in Wave 4 and the other from 16.07% (of 9 741 respondents) to 13.89% (of 12 025 respondents).

The majority of countries follow this declining of saving trend. However, France, Italy (except for people aged more than 65) and Austria and Denmark (only verified in general cases) increased their positive answers from Wave 2 to Wave 4.

Denmark, France and Sweden are the countries with highest ownership of Individual Retirement Accounts, while Italy, Netherlands and Spain are the ones with less. This fact is verified in all cases but for the population aged more than 65, Austria and Germany should be included in the countries with less ownership of Individual Retirement Accounts.

Regarding to who has Individual Retirement Accounts (tables 6, 7 and 8), Denmark, France and Sweden are also the countries where there is higher percentage of both household members owning IRA's, while Italy, Netherlands, Portugal and Spain are the countries with higher percentage for only one member of household owning IRA's.

There was an increase of the importance of female participation in household savings (table 9), from 47.69% of ownership of IRA's in Wave 2 to 50.20% in Wave 4. All the countries in the sample followed this increasing trend with exception of Netherlands, Spain and Sweden. France and Italy are the countries with the highest female participation ratio, 54.27% and 51.92% in Wave 4, respectively. While Denmark and Sweden are the ones with lowest female participation ratio, 43.56% and 45.99%, also values for Wave 4.

It's important to point the big increase registered in Italy, 40.54% in Wave 2 to 51.92% in Wave 4, becoming one of the countries with highest female rate and the decrease

registered in Spain, which were the country with highest female participation in Wave 2, from 56.55% to 50.76%.

Looking for the pre-retired population (table 10), it was registered a very small increase in female percentage, from 51.24% in Wave 2 to 51.97% in Wave 4. Germany, France and Austria are the countries with most female ownership or IRA's, 59.49%, 54.95% and 54.35% respectively. The most of countries registered values between 50% and 52% but Denmark and Portugal are the ones with the lowest rates, 44.83% and 48.44%.

Looking for the retired population, aged more than 65 (table 11), there was also an increasing trend with Italy and Portugal being the countries with the highest rates, 57.14% and 56.32%, respectively. Germany and Austria did not follow the increasing trend and are the ones with the lowest rates, 25.64% and 39.44%, respectively.

In summary, after the crisis (from Wave 2 to Wave 4) the percentage of population owning IRA's decreased but the female percentage increased, the population in pre-retirement age show higher ownership of IRA's percentage than the population in retirement age and lastly Denmark, France and Sweden are the countries with higher ownership of IRA's as well as the ownership by both partners.

6. Empirical Results

Table 13 presents results of Marginal effects from a Probit Regression of model 1 and 2, which were tested for Waves 2 and 4, respectively. In both models, the results show that the variables that have a strong positive relationship with the ownership of Individual Retirement Accounts are age, years of education and income. On the other hand, marital status (married) and risk showed a strong negative relationship. This means that married people and risk averse people are less likely to own Individual Retirement Accounts. The table also shows the values for the quality of the estimations and by 83.71% correctly predicted for Wave 2 and 79.97% for Wave 4, it's possible to conclude that the estimations have a good quality.

In Wave 2, gender showed statistically significance effect, in which male people are less likely to own Individual Retirement Accounts. This result is consistent with the works already done and referred in second section (Literature Review) of this work, in which the authors point for an increase of female participation ratio and also reflected in an increase of female percentage of ownership of Individual Retirement Accounts (tables 9 to 11). The number of children showed also a strong negative relationship only in Wave 2, which can be explained by the fact that people with children give more importance to the bequest motive, referred by Sturm (1983) and also by Lundberg and Ward-Batts (2000).

The presence of partner in household behaved different than the other variables, changing from strong negatively, in Wave 2, to strong positively relationship, in Wave 4. The positive relation found in Wave 4 can seem a bit contradictory with the results

obtained for married people. However the fact that partners living together doesn't mean necessarily they have to be married and then the results show that if both partners are not married but living together, they're more likely to own Individual Retirement Accounts.

In Wave 4, the ownership of dwelling presented strong positively related with the possession of Individual Retirement Accounts. It can be explained by the fact that households with high level of wealth tend to show higher levels of saving, including IRA's. This outcome is in line with the work of Alves and Cardoso (2010), in which they conclude that households' owners of dwelling where they live are associated with higher levels of saving.

The results for the current job situation (employed) showed a negative relation with the dependent variable, ownership of Individual Retirement Accounts, but only statistically significant at 5% in Wave 4, meaning that employed people are less likely to have IRA's. This result is not consistent with the conclusions taken by Fernández-López et al (2010), Alves and Cardoso (2010) and Beckmann et al (2013).

The variable High Education Degree showed no statistically significance in this test, which means that obtaining a high degree doesn't influence the ownership of IRA's. Although the number of years of education showed a strong positive relation, in both Waves tested, being in accordance with the results of Alves and Cardoso (2010) for this variable.

In Wave 2, household size presented no statistical significance which is consistent with Fernández-López et al (2010) and Alves and Cardoso (2010) that affirm that the saving

level, in this case for retirement, is not influenced by the household size but its capacity to generate income. However, in Wave 4 it showed statistically significant with negative effect in the ownership of IRA's being not in accordance with those authors.

The last variable with statistically significance influence in the possession of IRA's is nationality that shows the impact of country-level institutional factors in saving level, which is consistent with Fernández-López et al (2010) that referred that live in a country with mandatory private pension plans positively influence retirement saving. However, the current work doesn't go so further and can only verify the influence of countries on saving, making no distinction between each country present in the model.

There were also tested models for the SHARE population in pre-retirement age[10] (table 14 – models 3 and 4) and for the SHARE population in retirement age (table 15 – models 5 and 6).

In Wave 2, the variables age, marital status (married), presence of partner in household and income lost all the statistical significance when tested only for population in pre-retirement age, while years of education, number of children and country lost only one significance level. The ownership of dwelling gain significance level in pre-retirement age but it's only significant at 10%.

The results suffered no changes in Wave 4 when tested for pre-retirement age, being the same as for general sample.

[10] Considering 65 years as retirement age

Concerning the models for the SHARE population in retirement age, was found that, in Wave 2, gender (male), years of education and income are no more statistically significant and the presence of a partner in household and the number of children lost one significance level. In wave 4, age, marital status (married), partner in household and job situation are no longer statistically significant and income is only significant at 10%, losing two levels of significance.

Portugal was the only one country analyzed in individual, only in Wave 4 because Portugal was only included in SHARE in this Wave. The results are shown in table 16 (models 7, 8 and 9) and age, years of education, income and ownership of dwelling are the variables with positive significant effect in the possession of Individual Retirement Accounts. These results are consistent with the study of Alves and Cardoso (2010) and Garcia et al (2011) and are in line with results obtained for group of countries in Model 2. The number of children in Portugal showed a negative significant relation and risk averse people are less likely to possess IRA's.

The variables age and number of children lose statistical significance when we look for the population in pre-retirement age and income increases the significance, being positive related at 1%. However, income loses all significance in the results for population in retirement age, as well as ownership of dwelling, and age loses two levels of significance, falling to 10%.

7. Conclusions

In this work, SHARE data was used to come up with new estimates of the determinants and variables that influence household saving, in particular ownership of Individual Retirement Accounts. For that, were applied Probit models to the different samples created from SHARE data, for both Waves 2 and 4, taking as dependent variable, and binary, the ownership of Individual Retirement Accounts.

The findings of this work suggest that:

- age influence positively the ownership of IRA. However the most percentage of ownership of IRA's is verified in the sample with age between 50 and 65 and not in the oldest one. This can be maybe explained by the hump-shaped individual propensity to save, which means that young and old people are less likely to save than mid-age people. However with SHARE data, young side can't be analyzed because it only applies for people aged 50 or more.

- the significant results for gender, points that male individuals are negatively related with IRA's, which can be understood as an increase of female participation ratio on household decisions. The percentages of male and female ownership of IRA's also points for an increase in females side, since females raised their percentage in all samples analyzed.

- the results for nationality showed that the country where individuals live have significant effect on the decision make about household saving, in this case the

ownership of IRA's. The countries with higher percentage of ownership of IRA's are Denmark, France and Sweden.

- educated people showed more likely to own IRA's than no educated ones. However, the results points for an importance of the years of education (strong positive effect) and gives no importance to the fact of individuals having a high degree (no significant effect but positive).

- the results for marital status indicate that married individuals are less likely to own IRA's than the ones with different marital status. When individuals get married, they possibly opt by a different kind of saving, other than owning an individual retirement account, as well as thinking in their children (bequest motive) if that is the case.

- the presence of partner in household changing from significant negative effect in Wave 2 to positive, and also significant, in Wave 4 show that after the crisis the fact that both partners be living together is an important predictor for the ownership of IRA's.

- household size (significant in Wave 4) and the number of children (significant in Wave 2) showed both a negative effect on the ownership of IRA's. Usually, these variables are interconnected because, in normal households, the number of children defines the household size. Households with children can opt for bequest instead of the IRA's and sometimes as Lundberg and Ward-Batts (2000) affirmed, the cost of children, on average, outweighs the bequest motive.

- income influence positively the ownership of IRA's but the results points for employed individuals being less likely to own IRA's than the not employed ones, which seems to be contradictory. As the results for the job situation are only significant in Wave 4, it can mean that after the crisis being employed is not enough for individuals to be able to make savings and the income level makes the difference in this case.

- individuals that are owners of dwelling where they live, are more likely to own IRA's than the others because they have no expenditures with the rent of home and, for example, they can apply that money for saving.

- risk averse individuals showed less likely to own IRA's than the others. According to Beckmann et al (2013) there is an assumption saying that risk averse people don't diversify their portfolios and stick to one well-known saving instrument. By these results, it can be concluded that IRA's is not the saving instrument used by them.

- in Portugal, less variables showed significance. Only age, years of education, income and the ownership of dwelling have positive significance while the number of children and risk aversion negative. Income and the ownership of dwelling showed no significance for retirement age.

- By the differentiation between the individuals pre-retired aged and in retired age, the results showed that in retirement, gender, marital status, presence of partner in household, job situation and income are no longer significant predictors for the household saving, in what concerns to the ownership of IRA's.

- between the two periods, the results show that household saving level is decreasing, which can also be verified by the household saving rates reported by Eurostat (table 16). This fact contradicts the argument that people are aware of the problems and therefore will save more. Actually, people can be aware of this problem but due to the current financial situation, have no possibility to save. In addition, policy implications and the reforms on social security concerning a higher saving ratio didn't work, since saving rates are decreasing. The extent of this situation is worrying, and if there are no changes in the future, the world may face another problem that is the poverty in old age.

Limitations and suggestions for future works:

The age range of the SHARE (aged more than 50) is one limitation of this work because with this age ranger it's not possible to analyze the younger population, and for example to take conclusions about a possible hump-shaped relationship between age and the ownership of IRA's. The inexistence, in SHARE, of a variable that assesses respondents' financial literacy is another limitation because with variables available it's not possible to evaluate the influence of financial education. The method used in this work doesn't allow to conclude which countries have positive and negative effects in the ownership of IRA's, but only that has influence.

Some suggestions for future works could be the use of different models for each gender; the use *have contractual saving* variable as dependent variable; the use of data of Wave 5, when available, to make an analysis and a comparison in a larger time horizon; and the use of data from other surveys to come up with results for other

regions and to understand the differences and/or equalities between them, for example HRS (USA), TCLS (Transamerica), ELSA (England), JSTAR (Japan), CHARLS (China) or HILDA (Australia).

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SHARE questionnaires and guides:

<http://www.share-project.org/t3/share/fileadmin/pdf_questionnaire_wave_2/country_specific_questionnaire/Generic_version_english/Generic_Share_w2_Questionnaire.pdf>

<http://www.share-project.org/fileadmin/pdf_questionnaire_wave_4/SHARE_generic_wave4_main_questionnaire.pdf>

<http://www.share-project.org/fileadmin/pdf_documentation/SHARE_guide_release_2-6-0.pdf>

<http://www.share-project.org/fileadmin/pdf_documentation/SHARE_wave_4_release_guide_1.1.1.pdf>

<http://www.share-project.org/fileadmin/pdf_documentation/Imputation_of_Missing_Data_in_Waves_1_and_2_of_SHARE.pdf>

Appendix

Table 1 – Definition of variables

Variable	Description
Has individual retirement accounts	Assumes value 1 if respondent has IRA's; 0 otherwise
Age	Age of the respondent
Male	Assumes value 1 if respondent is male; 0 otherwise
Nationality	Nationality of respondent: 11 = Austria; 12 = Germany; 13 = Sweden; 14 = Netherlands; 15 = Spain; 16 = Italy; 17 = France; 18 = Denmark; 33 = Portugal
Years of education	Number of years of education of respondent
High education degree obtained	Assumes value 1 if respondent has a high degree; 0 otherwise
Married	Assumes value 1 if respondent is married; 0 otherwise
Partner in household	Assumes value 1 if respondent's partner is in household; 0 otherwise
Household size	Number of persons in household
Number of children	Number of children in household
Employed	Assumes value 1 if respondent is employed; 0 otherwise
Income	Income received in previous year
Own dwelling	Assumes value 1 if respondent has the ownership of dwelling; 0 otherwise
Risk aversion	Attitude toward taking financial risks: 1 = respondent isn't willing to take any financial risks; 0 otherwise

Table 2 – Description of waves by models and its total observations

	Wave 2	Wave 4	Portugal (wave 4)
general	model 1	model 2	model 7
total observations	19 961	28 937	2 080
pre-retirement	model 3	model 4	model 8
total observations	5 787	11 552	911
post-retirement	model 5	model 6	model 9
total observations	14 174	17 372	1 164

Table 3 – SHARE population owning Individual retirement accounts (all population)

Has individual retirement accounts	All countries		Austria		Denmark		France		Germany	
	w2	w4	w2	w4	w2	w4	w2	w4	w2	w4
refusal	1,72%	0,96%	0,68%	0,43%	1,77%	0,78%	2,89%	1,86%	2,39%	1,90%
don't know	0,82%	0,76%	0,11%	0,24%	1,08%	0,46%	1,18%	1,61%	0,60%	0,66%
no	76,63%	78,76%	91,09%	88,80%	60,33%	61,72%	65,08%	57,96%	83,92%	86,22%
yes	20,83%	19,52%	8,12%	10,53%	36,82%	37,04%	30,85%	38,57%	13,09%	11,22%
Total observations	13 489	19 466	887	3 733	1 757	1 531	2 039	4 037	1 673	1 052
Has individual retirement accounts	Italy		Netherlands		Portugal		Spain		Sweden	
	w2	w4	w2	w4	w2	w4	w2	w4	w2	w4
refusal	1,31%	0,79%	0,39%	0,43%	-	0,75%	1,99%	0,62%	1,79%	0,95%
don't know	0,26%	0,65%	1,21%	0,96%	-	1,12%	1,03%	0,27%	0,72%	0,51%
no	96,49%	96,29%	90,11%	90,48%	-	82,07%	87,02%	90,34%	50,92%	58,42%
yes	1,94%	2,27%	8,29%	8,13%	-	16,06%	9,96%	8,77%	46,57%	40,12%
Total observations	1 911	2 293	1 810	1 869	-	1 339	1 456	2 246	1 956	1 366

Table 4 – SHARE population owning Individual retirement accounts (population aged between 50 and 65)

Has individual retirement accounts - 50-65	All countries		Austria		Denmark		France		Germany	
	w2	w4	w2	w4	w2	w4	w2	w4	w2	w4
refusal	1,73%	0,84%	1,25%	0,20%	1,25%	0,73%	1,92%	1,47%	2,49%	1,22%
don't know	0,75%	0,55%	-	0,20%	0,36%	0,44%	0,80%	0,71%	0,42%	0,61%
no	64,30%	69,98%	73,75%	78,29%	36,78%	43,63%	62,34%	56,70%	71,16%	74,01%
yes	33,22%	28,63%	25,00%	21,31%	61,61%	55,20%	34,94%	41,12%	25,93%	24,16%
Total observations	3 748	7 432	160	1 511	560	683	624	1 695	482	327
Has individual retirement accounts - 50-65	Italy		Netherlands		Portugal		Spain		Sweden	
	w2	w4	w2	w4	w2	w4	w2	w4	w2	w4
refusal	2,38%	1,52%	0,17%	0,68%	-	0,35%	3,15%	0,61%	1,55%	0,32%
don't know	0,87%	0,63%	1,34%	0,41%	-	1,41%	1,45%	0,25%	0,22%	0,96%
no	91,34%	92,17%	83,89%	83,90%	-	75,70%	73,12%	79,56%	28,83%	30,87%
yes	5,41%	5,68%	14,60%	15,01%	-	22,54%	22,28%	19,58%	69,40%	67,85%
Total observations	462	792	596	733	-	568	413	812	451	311

Table 5 – SHARE population owning Individual retirement accounts (population aged more than 65)

Has individual retirement accounts - > 65	All countries		Austria		Denmark		France		Germany	
	w2	w4	w2	w4	w2	w4	w2	w4	w2	w4
refusal	1,71%	1,03%	0,55%	0,59%	2,00%	0,82%	3,32%	2,14%	2,35%	2,21%
don't know	0,84%	0,90%	0,14%	0,27%	1,42%	0,47%	1,34%	2,26%	0,67%	0,69%
no	81,38%	84,18%	94,91%	95,94%	71,35%	76,30%	66,29%	58,89%	89,09%	91,72%
yes	16,07%	13,89%	4,40%	3,20%	25,23%	22,41%	29,05%	36,71%	7,89%	5,38%
Total observations	9 741	12 025	727	2 219	1 197	848	1 415	2 340	1 191	725
Has individual retirement accounts - > 65	Italy		Netherlands		Portugal		Spain		Sweden	
	w2	w4	w2	w4	w2	w4	w2	w4	w2	w4
refusal	0,96%	0,40%	0,50%	0,26%	-	1,05%	1,54%	0,63%	1,86%	1,14%
don't know	0,07%	0,66%	1,15%	1,32%	-	0,91%	0,86%	0,28%	0,87%	0,38%
no	98,14%	98,47%	93,16%	94,72%	-	86,70%	92,52%	96,44%	57,54%	66,54%
yes	0,83%	0,47%	5,19%	3,70%	-	11,34%	5,08%	2,65%	39,73%	31,94%
Total observations	1 449	1 501	1 214	1 136	-	767	1 043	1 434	1 505	1 055

Table 6 – Distribution of who has Individual retirement accounts in SHARE population (all population)

Who has individual retirement accounts	All countries		Austria		Denmark		France		Germany	
	w2	w4	w2	w4	w2	w4	w2	w4	w2	w4
refusal	0,22%	0,18%	-	-	0,56%	-	0,23%	0,41%	0,53%	-
don't know	0,22%	0,26%	-	0,38%	-	0,22%	0,70%	0,30%	-	-
respondent only	27,94%	28,49%	31,48%	28,90%	28,76%	27,67%	24,94%	25,59%	31,58%	24,47%
(husband/wife/ parter) only	16,90%	15,53%	25,93%	15,97%	15,04%	13,51%	15,15%	10,19%	15,26%	29,79%
both	54,72%	55,54%	42,59%	54,75%	55,64%	58,60%	58.98%	63,51%	52,63%	45,74%
Total observations	2 237	2 717	54	263	532	459	429	981	190	94
Who has individual retirement accounts	Italy		Netherlands		Portugal		Spain		Sweden	
	w2	w4	w2	w4	w2	w4	w2	w4	w2	w4
refusal	-	-	-	-	-	-	-	0,62%	-	-
don't know	-	-	-	-	-	1,26%	0,85%	-	0,13%	-
respondent only	40,00%	41,18%	38,24%	29,41%	-	41,14%	32,20%	32,92%	24,87%	28,50%
(husband/wife/ parter) only	23,33%	29,41%	29,41%	36,77%	-	12,66%	28,81%	21,12%	14,57%	17,15%
both	36,67%	29,41%	32,35%	33,82%	-	44,94%	38,14%	45,34%	60,43%	54,35%
Total observations	30	51	136	136	-	158	118	161	748	414

Table 7 – Distribution of who has Individual retirement accounts in SHARE population (population aged between 50 and 65)

Who has individual retirement accounts - 50-65	All countries		Austria		Denmark		France		Germany	
	w2	w4	w2	w4	w2	w4	w2	w4	w2	w4
refusal	0,30%	0,31%	-	-	0,70%	-	-	0,79%	0,92%	-
don't know	0,20%	0,31%	-	-	-	0,32%	0,63%	0,39%	-	-
respondent only	28,37%	30,10%	31,25%	30,27%	27,62%	25,56%	31,25%	31,03%	32,11%	29,23%
(husband/wife/ parter) only	16,45%	15,41%	21,87%	15,60%	13,99%	11,82%	15,00%	11,66%	11,93%	21,54%
both	54,68%	53,87%	46,88%	54,13%	57,69%	62,30%	53,12%	56,13%	55,04%	49,23%
Total observations	1 015	1 628	32	218	286	313	160	506	109	65
Who has individual retirement accounts - 50-65	Italy		Netherlands		Portugal		Spain		Sweden	
	w2	w4	w2	w4	w2	w4	w2	w4	w2	w4
refusal	-	-	-	-	-	-	-	0,78%	-	-
don't know	-	-	-	-	-	2,02%	1,35%	-	-	-
respondent only	26,09%	40,91%	40,50%	29,30%	-	38,38%	28,38%	32,03%	21,83%	26,62%
(husband/wife/ parter) only	30,43%	27,27%	34,18%	40,40%	-	15,15%	29,73%	18,75%	10,71%	10,26%
both	43,48%	31,82%	25,32%	30,30%	-	44,44%	40,54%	48,44%	64,46%	62,82%
Total observations	23	44	79	99	-	99	74	128	252	156

Table 8 – Distribution of who has Individual retirement accounts in SHARE population (population aged more than 65)

Who has individual retirement accounts - > 65	All countries		Austria		Denmark		France		Germany	
	w2	w4	w2	w4	w2	w4	w2	w4	w2	w4
refusal	0,16%	-	-	-	0,41%	-	0,37%	-	-	-
don't know	0,24%	0,18%	-	2,22%	-	-	0,74%	0,21%	-	-
respondent only	27,58%	26,08%	31,82%	22,22%	30,08%	32,19%	21,19%	19,79%	30,87%	13,79%
(husband/wife/ parter) only	17,27%	15,70%	31,82%	17,78%	16,26%	17,12%	15,24%	8,63%	19,75%	48,28%
both	54,75%	58,04%	36,36%	57,78%	53,25%	50,69%	62,46%	71,37%	49,38%	37,93%
Total observations	1 222	1 089	22	45	246	146	269	475	81	29
Who has individual retirement accounts - > 65	Italy		Netherlands		Portugal		Spain		Sweden	
	w2	w4	w2	w4	w2	w4	w2	w4	w2	w4
refusal	-	-	-	-	-	-	-	-	-	-
don't know	-	-	-	-	-	-	-	-	0,20%	-
respondent only	85,71%	42,86%	35,09%	29,73%	-	45,76%	38,64%	36,37%	26,41%	29,46%
(husband/wife/ parter) only	-	42,86%	22,81%	27,03%	-	8,48%	27,27%	30,30%	16,53%	21,32%
both	14,29%	14,28%	42,10%	43,24%	-	45,76%	34,09%	33,33	56,86%	49,22%
Total observations	7	7	57	37	-	59	44	33	496	258

Table 9 – Distribution of who has Individual retirement accounts in SHARE population by gender (all population)

Has individual retirement accounts	All countries		Austria		Denmark		France		Germany	
	w2	w4	w2	w4	w2	w4	w2	w4	w2	w4
male	52,31%	49,80%	58,33%	48,35%	60,43%	56,46%	47,54%	45,73%	53,88%	51,69%
female	47,69%	50,20%	41,67%	51,65%	39,57%	43,56%	52,46%	54,27%	46,12%	48,31%
Total observations	2 810	3 799	72	393	647	567	629	1 557	219	118
Has individual retirement accounts	Italy		Netherlands		Portugal		Spain		Sweden	
	w2	w4	w2	w4	w2	w4	w2	w4	w2	w4
male	59,46%	48,08%	48,67%	50,00%	-	53,49%	43,45%	49,24%	50,71%	54,01%
female	40,54%	51,92%	51,33%	50,00%	-	46,51%	56,55%	50,76%	49,29%	45,99%
Total observations	37	52	150	152	-	215	145	197	911	548

Table 10 – Distribution of who has Individual retirement accounts in SHARE population by gender (population aged between 50 and 65)

Has individual retirement accounts – 50-65	All countries		Austria		Denmark		France		Germany	
	w2	w4	w2	w4	w2	w4	w2	w4	w2	w4
male	48,76%	48,03%	60,00%	45,65%	55,94%	55,17%	47,71%	45,05%	45,60%	40,51%
female	51,24%	51,97%	40,00%	54,35%	44,06%	44,83%	52,29%	54,95%	54,40%	59,49%
Total observations	1 245	2 128	40	322	345	377	218	697	125	79
Has individual retirement accounts – 50-65	Italy		Netherlands		Portugal		Spain		Sweden	
	w2	w4	w2	w4	w2	w4	w2	w4	w2	w4
male	64,00%	48,89%	44,83%	47,27%	-	51,56%	40,22%	47,80%	43,77%	49,76%
female	36,00%	51,11%	55,17%	52,73%	-	48,44%	59,78%	52,20%	56,23%	50,24%
Total observations	25	45	87	110	-	128	92	159	313	211

Table 11 – Distribution of who has Individual retirement accounts in SHARE population by gender (population aged more than 65)

Has individual retirement accounts - > 65	All countries		Austria		Denmark		France		Germany	
	w2	w4	w2	w4	w2	w4	w2	w4	w2	w4
male	55,14%	52,10%	56,25%	60,56%	65,56%	58,95%	47,45%	46,33%	64,89%	74,36%
female	44,86%	47,90%	43,75%	39,44%	34,44%	41,05%	52,55%	53,67%	35,11%	25,64%
Total observations	1 565	1 670	32	71	302	190	411	859	94	39
Has individual retirement accounts - > 65	Italy		Netherlands		Portugal		Spain		Sweden	
	w2	w4	w2	w4	w2	w4	w2	w4	w2	w4
male	50,00%	42,86%	53,97%	57,14%	-	43,68%	49,06%	55,26%	54,35%	56,68%
female	50,00%	57,14%	46,03%	42,86%	-	56,32%	50,94%	44,74%	45,65%	43,32%
Total observations	12	7	63	42	-	87	53	38	598	337

Table 12 - Household saving rates by percentage of household disposable income

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
All countries	14,98	13,97	12,88	12,32	11,51	11,24	12,67	12,87	12,80	12,23	11,69	11,75	12,06	12,67	14,07	12,47	12,31	12,26	11,83
Austria	17,04	14,31	12,79	13,35	14,65	14,09	12,57	12,91	13,66	14,03	14,46	15,13	16,33	16,31	16,11	13,98	12,03	12,62	-
Denmark	7,60	7,29	5,01	6,28	2,98	4,28	9,56	9,51	9,79	6,37	3,71	5,45	4,25	5,10	8,40	7,70	7,70	6,61	6,87
France	15,56	14,58	15,56	14,96	14,37	14,10	14,75	16,01	15,00	15,44	14,39	14,61	15,11	15,26	16,05	15,56	15,61	15,20	-
Germany	16,63	16,26	15,93	15,94	15,31	15,10	15,21	15,71	15,98	16,12	16,28	16,39	16,84	17,37	16,97	16,89	16,43	16,44	-
Italy	21,84	22,55	20,09	16,55	15,80	13,99	15,80	16,69	16,25	16,53	16,42	15,89	15,46	15,20	14,26	12,37	11,95	11,63	12,91
Netherlands	18,83	17,43	17,85	16,87	13,99	12,11	14,69	13,90	13,10	13,05	12,27	12,19	13,04	12,15	12,35	10,48	11,57	10,74	-
Portugal	12,66	11,72	10,88	10,30	10,69	10,59	10,62	10,28	10,70	9,96	9,98	8,03	6,99	7,06	10,86	10,13	9,73	11,96	12,58
Spain	-	-	-	-	-	11,07	10,98	11,12	12,11	10,99	10,81	10,24	10,38	13,75	17,79	13,86	12,66	10,36	-
Sweden	9,64	7,61	4,91	4,34	4,25	5,82	9,86	9,68	8,58	7,59	6,93	7,82	10,11	11,83	13,81	11,26	13,10	14,79	14,94

Source: Eurostat

Table 13 – Marginal effects from *Probit* Regression

	Model 1	Model 2
Wave	2	4
Age	0,0183493***	0,014491***
	(0,004366)	(0,0016951)
Male	-0,2640075**	0,0207021
	(0,1038704)	(0,0323777)
Nationality	0,0827814***	0,0238923***
	(0,6340663)	(0,0023571)
Years of Education	0,0290962***	0,0514614***
	(0,0109362)	(0,0034587)
High Education	0,0011516	-0,0000797
	(0,0020582)	(0,0007348)
Married	-0,4914483*	-0,2382071***
	(0,2857534)	(0,0617959)
Partner in household	-0,301089***	0,291622***
	(0,1091568)	(0,0659328)
Household Size	0,0633852	-0,0646553
	(0,0429099)	(0,0187936)
Number of Children	-0,0957937***	-0,0105042
	(0,0340706	(0,0117117)
Employed	-0,0070185	-0,0035995*
	(0,0055769)	(0,0016303)
Income	0,3398402**	0,1389417**
	(0,1731486)	(0,0516119)
Own Dwelling	0,1324044	0,3365688***
	(0,0923827)	(0,0373336)
Risk Aversion	-0,6340663***	-0,4763434***
	(0,0973427)	(0,0352479)
Number of observations	1240	9306
Correctly Predicted	83,71%	79,97%
Log Likelihood	-477,25383	-4229,5939
Pseudo R^2	0,1466	0,1038
LR χ^2 (13)	163,96	979,89

Notes: Marginal effects from Probit model. The standard errors are in parentheses.
*: significant at the 10% level
**: significant at the 5% level
***: significant at the 1% level.

Table 14 – Marginal effects from *Probit* Regression (population aged between 50 and 65)

	Model 3	Model 4
Wave	2	4
Age	0,0570329	0,0257081***
	(0,0349153)	(0,0057481)
Male	-0,4079188**	0,0241034
	(0,1640103)	(0,043081)
Nationality	0,0842227**	0,0177732***
	(0,0376604)	(0,0033179)
Years of Education	0,0466553**	0,442931***
	(0,0189904)	(0,0045871)
High Education	0,0049613	-0,0012096
	(0,0034173)	(0,001217)
Married	-0,2439305	-0,1919011***
	(0,3743035)	(0,732946)
Partner in household	-0,192876	0,3862253***
	(0,1673724)	(0,079536)
Household Size	0,0213103	-0,082348***
	(0,0687262)	(0,023277)
Number of Children	-0,1138087*	-0,0193402
	(0,0645624)	(0,0179694)
Employed	-0,0185165	-0,0043985**
	(0,0183622)	(0,002164)
Income	0,1637495	0,226153***
	(0,2541687)	(0,0567923)
Own Dwelling	0,272295*	0,2876176***
	(0,1548014)	(0,0506808)
Risk Aversion	-0,5302678***	-0,4724115***
	(0,1620807)	(0,0461172)
Number of observations	355	4450
Correctly Predicted	75,21%	73,30%
Log Likelihood	-180,71834	-2394,7629
Pseudo R^2	0,1193	0,0824
LR χ^2 (13)	48,95	430,08

Notes: Marginal effects from Probit model. The standard errors are in parentheses.
*: significant at the 10% level
**: significant at the 5% level
***: significant at the 1% level.

Table 15 – Marginal effects from *Probit* Regression (population aged more than 65)

	Model 5	Model 6
wave	2	4
Age	0,0176577***	-0,0031899
	(0,0067926)	(0,0032814)
Male	-0,1517996	0,0579876
	(0,1356975)	(0,0512377)
Nationality	0,0873448***	0,0334223***
	(0,0313627)	(0,0034436)
Years of Education	0,0204199	0,063788***
	(0,013793)	(0,0054621)
High Education	-0,0014422	0,0003805
	(0,0027346)	(0,000934)
Married	-0,874545*	-0,1710634
	(0,5086518)	(0,1207554)
Partner in household	-0,3427076**	0,1994887
	(0,1472702)	(0,1269263)
Household Size	0,0862764	-0,1177792***
	(0,0565219)	(0,0386533)
Number of Children	-0,0801435**	-0,0000352
	(0,0405722)	(0,015634)
Employed	-0,0054318	-0,0026654
	(0,0064838)	(0,0025153)
Income	0,5057469**	-0,2035231*
	(0,2425842)	(0,1098047)
Own Dwelling	0,0696741	0,3863669***
	(0,1177277)	(0,0564933)
Risk Aversion	-0,7153142***	-0,4603065***
	(0,1237444)	(0,0556274)
Number of observations	885	4856
Correctly Predicted	87,68%	85,69%
Log Likelihood	-290,8967	-1789,1697
Pseudo R^2	0,1394	0,0994
LR χ^2 (13)	94,27	394,97

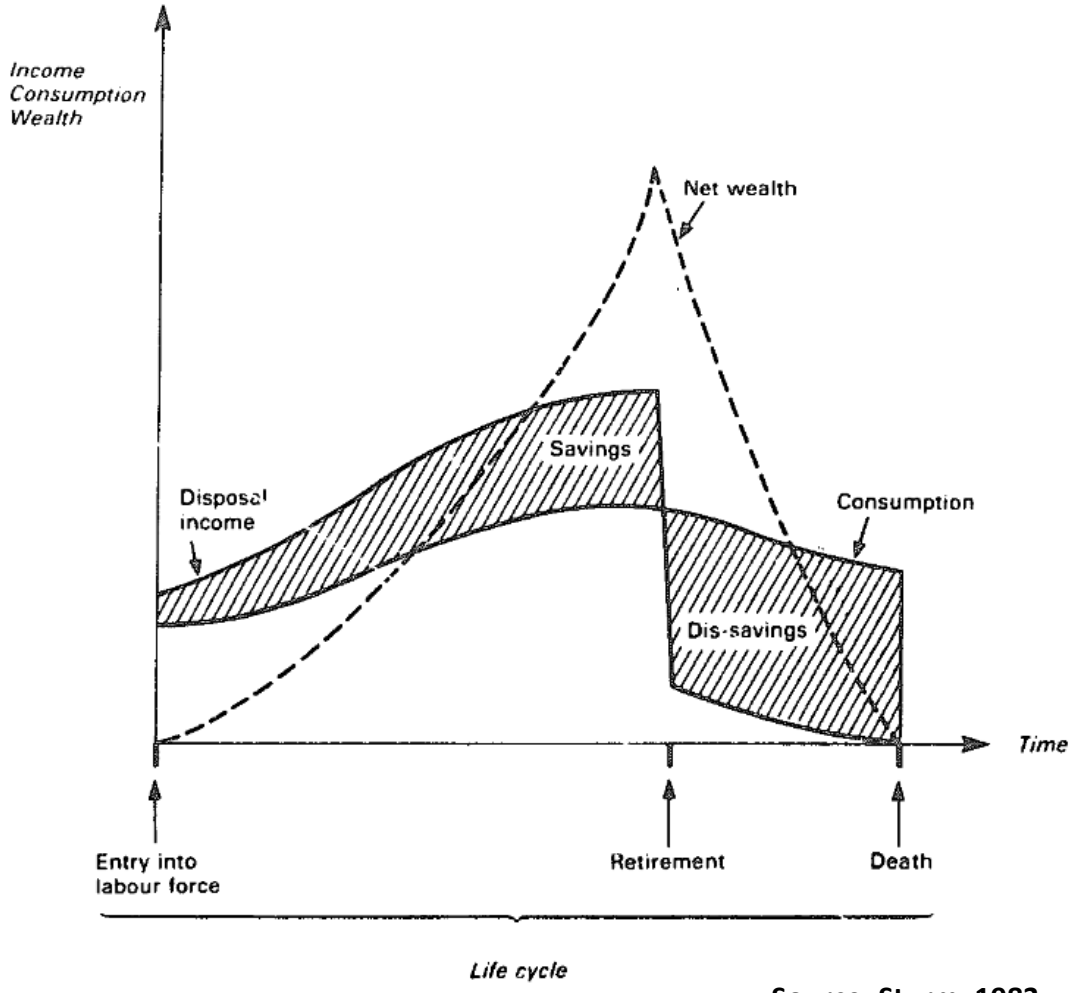
Notes: Marginal effects from Probit model. The standard errors are in parentheses.
*: significant at the 10% level
**: significant at the 5% level
***: significant at the 1% level.

Table 16 – Marginal effects from *Probit* Regression (Portugal population)

	Model 7	Model 8	Model 9
wave	4	4	4
age	all	50-65	>65
Age	0,0166152***	0,0073448	0,0171319*
	(0,0050681)	(0,0175264)	(0,0094945)
Male	0,0398748	0,0377549	0,0556538
	(0,0954712)	(0,1346)	(0,1409294)
Years of Education	0,066009***	0,0838177***	0,0558731***
	(0,0099299)	(0,0149214)	(0,0140355)
High Education	0,0022915	-0,001892	0,0034236
	(0,00208)	(0,0053417)	(0,0024052)
Married	-0,1701227	-0,179879	-0,0828424
	(0,1798657)	(0,2223712)	(0,3393907)
Partner in household	0,1797324	0,2110805	0,1040259
	(0,1871842)	(0,2327928)	(0,3469047)
Household Size	0,0450078	-0,0103467	0,0838511
	(0,0417211)	(0,058653)	(0,0641701)
Number of Children	-0,1169926***	-0,0211236	-0,1768875***
	(0,0375573)	(0,0591649)	(0,0509686)
Employed	-0,0053003	-0,0088765	-0,0005268
	(0,0042131)	(0,0064093)	(0,00568)
Income	0,3677728**	0,66967***	0,0112656
	(0,1487904)	(0,1999989)	(0,2394362)
Own Dwelling	0,249087**	0,3230043**	0,1854419
	(0,1078264)	(0,1613882)	(0,1495668)
Risk Aversion	-0,7454972***	-0,687043***	-0,7920102***
	(0,1317463)	(0,2000478)	(0,1783595)
Number of observations	1247	531	716
Correctly Predicted	82,68%	77,40%	87,01%
Log Likelihood	-511,01329	-255,99271	-247,48968
Pseudo R^2	0,1363	0,1435	0,1110
LR χ^2 (12)	161,30	85,76	61,81

Notes: Marginal effects from Probit model. The standard errors are in parentheses.
*: significant at the 10% level
**: significant at the 5% level
***: significant at the 1% level.

Chart 1 – Income, savings, consumption and wealth over the life cycle



Source: Sturm, 1983